

TITLE: Electromagnetic lock provided with a sliding bolt for a swinging-type door

The instant invention relates to an electromagnetic lock provided with a retractable sliding bolt for a swinging-type door, that is, a lock comprising a doubly-tapered bolt, the door being openable by pulling or pushing.

In known locks, the bolt slides in the opening plane by compressing a return spring when an action is exerted against the door.

To oppose the opening of the door, these locks are provided with a locking device preventing the bolt from sliding backward, the device being made of a movable mechanical member that prevents the bolt from sliding back in the locking position.

In general, the movable mechanical locking member is controlled by an electromagnet which, when energized, maintains the aforementioned member in the locking position. If the electromagnet is no longer energized, the aforementioned member retracts by means of a return spring.

Such a lock cannot be used in the case of a door which, while being maintained closed, must be openable, should fortuitous event, such as a fire alarm, occur.

The occurrence of such an event triggers the opening of the electrical circuits, either automatically, or by the security staff.

In general, the alarm trigger causes a panic situation, whereby a large number of people exert an action on the door (an emergency exit, for example), which results in each door being suddenly subjected to a substantial force, and the moving parts (bolt and movable locking member) being blocked one against

the other. Experience has shown that a power shut-off has no effect because the force of the return spring is much too insufficient to overcome the force pressing the movable members against one another.

The solution would be to interrupt the power supply as soon as an ill-timed event occurs; but here again, experience has shown that this synchronization is very difficult to achieve.

The lock according to the invention, which overcomes these drawbacks, is characterized in that the conventional bolt is supported by the movable armature of an electromagnet, said armature keeping the bolt in the locking position by the action of two forces acting in the same direction, one resulting from the spring action, and the other from the action of the electromagnet core when it is energized.

When the electromagnet is energized, the locking is efficient and the bolt is not displaceable.

When the electromagnet is not energized, the bolt is in the exit position, in engagement with the catch, by the action of the springs, and the door is therefore maintained closed in the opening plane. However, pressure on the door makes it possible to slide the bolt backward.

The invention will be better understood from the description that follows, with reference to the annexed drawings and by way of non-limiting examples, in which:

- Figure 1 is a top view of a lock according to the invention;
- Figure 2 is a cross-sectional view along the line II-II of Figure 1;
- Figure 3 is a view, similar to that of 1, showing the position of the movable members during the door opening.

Referring to the drawings, one sees that the lock is made, as known, of a body 1 fixed, for example, to the edge of the door, and of a plate 2 fastened on the fixed portion and forming the catch for retaining the bolt 3.

According to the invention, the bolt 3 is supported by a plate 4, which is displaceable parallel to the edge comprising the plate 2.

The plate 4 is subjected to the action of springs 5 that tend to displace said plate in order to make the bolt protrude.

The plate 4 forms the movable armature of an electromagnet, the core 6 of which, when energized, displaces said plate in view of making the bolt protrude by then opposing its sliding backward. This is the position shown in Figures 1 and 2, which show that the springs 5 press the plate 4 against the core 6.

As seen from the drawing, the plate 4 is guided on columns 7, the axes of which are parallel to the bolt displacement direction. The springs 5 are advantageously guided on columns 7.

In its normal operation, the electromagnet is energized and the bolt therefore cannot slide backward: the lock is locked.

If the power supply to the electromagnet is interrupted, the bolt stays engaged with the catch by action of the springs 5, the door remains closed but not locked, and a mere push on the latter will make it possible to open it.

If a fortuitous event causes a panic situation, people will rush to the doors, exerting a substantial amount of pressure thereon; but this pressure will help with the door opening while the installation's electric power supply is disconnected.

From the above explanations, one can see that the lock according to the invention, contrary to known ones, ensures great safety during a panic reaction.